

COMPONENTS

FAQ

Q Could you tell me if PCI-E is better for games than AGP?

A The AGP 8x interface provides a single 2GB/s connection to and a single 266MB/s link from the graphics card, but only one can be used at time. PCI-E x16 has two 4GB/s links, and data can be sent to and from the card at this full speed at the same time. This means the card can be used by the processor to offload tasks other than just graphics. Nvidia's latest graphics cards, the GeForce 8800 range, provide this capability for game programmers.

However, there are currently no games that use this technique. So PCI-E is technically better than AGP for games, but only when the hardware and software are designed to take advantage of its full-duplex link and extra bandwidth. The poor availability of AGP graphics cards is due to graphics card manufacturers deciding to push PCI-E.

David Ludlow
Deputy Editor

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SAPPHIRE X1950 Pro AGP

★★★★★

£148 inc VAT



If you have an AGP-based motherboard, you're probably feeling a bit ripped off at the lack of fast graphics cards available for your PC. Luckily, Sapphire has released a version of ATI's Radeon X1950 Pro for AGP. We're huge fans of the PCI-E version of the card, and Gigabyte's GV-RX195P256D-RH is included in our 'Also consider...' list below as our choice card for PCI-E.

Naturally, building this card for AGP has meant a slight change in design from the PCI-E version. The AGP slot doesn't deliver as much power as PCI-E. There's also no PCI-E power connector available in AGP PCs. To provide enough power to the graphics card, Sapphire has fitted the X1950 Pro AGP with two Molex power connectors. There's a long Molex splitter cable in the box, so you need just one free connector in your case to use the card. The design is neat, and the X1950 Pro AGP takes up just a single slot. It runs quietly, as there's only a single fan used to cool the graphics processor.

There have been some changes in specification with the move from PCI-E. These are minimal, though. While the X1950 Pro AGP has a slightly slower core speed of 575MHz (the PCI-E version has a core speed of 600MHz), it still has the same 36 pixel pipelines. The PCI-E X1950 Pro graphics cards we've seen had 256MB of GDDR3 memory running at 700MHz (1.4GHz effective), but this AGP card has 512MB of GDDR3 memory running at 690MHz (1.38GHz) effective. On paper, then, the two versions of this card are very close.

Our games tests were run on an nForce 3 motherboard with an Athlon 64 3500+ and 512MB of



memory. We found the performance was only a little below the pace set by the PCI-E cards in all tests except Call of Duty 2. Here, Sapphire's X1950 Pro AGP lagged behind Gigabyte's GV-RX195P256D-RH, which scored 50.7fps using the same settings. There are likely to be several reasons for this beyond the minor difference in specifications. For a start, AGP has slightly less bandwidth than PCI-E. Second, the X1950 Pro is designed for PCI-E graphics cards, so the AGP version uses a bridge chip that can affect performance. One of

the benefits of having a fast graphics card is being able to run games at high resolutions as well as high detail settings. We turned all our games up to a resolution of 1,600x1,200 to see how the card coped. It did extremely well in all our tests. Call of Duty 2's score of 29.1fps is particularly good, as it shows that this card can cope with demanding games at high resolutions.

Sapphire's X1950 Pro isn't quite as fast as the PCI-E versions, but it is extremely close. For AGP owners, this graphics card is a saviour. Not only is it the best-value graphics card you can buy for AGP, but it's also the best performer.

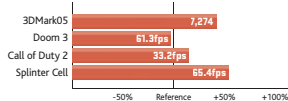
David Ludlow

SUMMARY

- ✓ Excellent price
- ✓ Excellent performance
- ✓ Comes with all necessary cables

AGP GRAPHICS CARD ATI Radeon X1950 Pro, 8x AGP interface, 36 pixel pipelines, 512MB GDDR3 memory running at 690MHz (1.38GHz effective), 575MHz core speed, two DVI, TV-out
PART CODE 11095-03-20R
SUPPLIER www.novatech.co.uk
DETAILS www.sapphiretech.com

PERFORMANCE (see page 56)



Also consider...

INTEL Core 2 Duo E6700

★★★★★

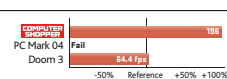
£340 inc VAT



Intel's new processor is based on the company's mobile technology. It is designed to be much more efficient than the P4. It's incredibly quick, achieving some of the highest benchmark results we've ever seen. You'll need a new Intel 965 or 975-based motherboard to use the E6700, but it's worth every penny, as it's by far the best-value processor you can buy.



PROCESSOR Two cores running at 2.66GHz, LGA775, 267MHz external bus, 4MB L2 cache
PART CODE BX805576700
SUPPLIER www.aria.co.uk
DETAILS www.intel.com
✓ Extremely fast; great value
FULL REVIEW Oct 2006



GIGABYTE GV-RX195P 256D-RH

★★★★★

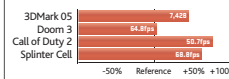
£136 inc VAT



Gigabyte's Radeon X1950 Pro-based graphics card uses a Zalman VF700 cooler, so it's silent as well as powerful. It's incredibly fast, tearing through our games tests with an impressive score of 50.7fps in Call of Duty 2. The price is unbelievable. This is the best-value graphics card you can buy.



GRAPHICS CARD ATI Radeon X1950 Pro, PCI-E x16 interface, 36 pixel pipelines, 256MB GDDR3 memory running at 700MHz (1.4GHz effective), 600MHz core speed, two DVI, TV-out
PART CODE GV-RX195P256D-RH
SUPPLIER www.lambdatek.com
DETAILS www.gigabyte.com.tw
✓ Excellent performance
✗ Fan quite bulky
FULL REVIEW Mar 2007



ANTEC Nine Hundred

★★★★★

£67 inc VAT

A PC's case has a huge impact on how many peripherals you can connect, how quiet your computer is and how cool it will run. The case also defines how your PC looks. Antec's Nine Hundred certainly looks impressive. Its black mesh front is appealing, while the window in the side of the case lets you show off your PC's insides with the addition of lights or coloured fans (see *PC Builder, Shopper* February 2007 for details).

The Nine Hundred has been carefully designed so it's easy to use when it's standing on the floor. The top of the case houses the stuff that's usually mounted on the front of other cases. So you've got quick access to audio in and out, and two USB and one FireWire ports without having to bend over and fiddle around. The power and reset buttons are also here. Fortunately, they're recessed, so you can't accidentally hit them or reset your PC by dropping something. This design keeps the front looking nice and clean and avoids the need for concealing flaps.

The top of the case has a small tray, which takes the anti-slip mat provided in the box. This may sound like a strange addition to a case, but it's surprisingly useful. When we were building a PC into the Nine Hundred, we found it a handy place to store the screws and screwdriver, so we didn't lose anything in the process.

Antec's instructions aren't the best, but the case is quite simple. The windowed side panel is attached by thumbscrews and once it's removed there's a surprising amount of room to work. Slipping a motherboard into place is easy, although it's likely that you'll need to replace the bundled motherboard back plate with the one supplied with your motherboard.

The case can hold up to six hard disks, spread over two removable cages. Getting the



cages out is fiddly, as you have to remove the second side panel and undo four thumbscrews per cage. However, once the cages are removed, inserting the hard disks is easy. There are three 5¼in optical drive bays; you can use one of them to house a floppy drive or memory card reader, but you'll have to install the supplied adaptor.

As with Antec's top-of-the-range P180, the power supply sits at the bottom of the case. This doesn't make installation any trickier, but it does mean you end up with cables trailing across the motherboard. As most power supplies are designed to sit at the top of a case, you might have trouble with some power supplies' motherboard cables stretching far enough. We recommend buying some case clips to keep the inside tidy and ensure good airflow. On the plus side, locating the power supply at the bottom gives Antec plenty of room at the top of the case for a massive 200mm fan. This helps draw air out of your case, so you can pack it with the latest components and powerful graphics cards and

your PC will still run cool. The fan has a three-speed fan control built in, too, so you can help keep your PC quiet as well as cool.

The Nine Hundred also ships with two front-mounted 120mm fans, each with a three-step speed control. Each one cools a hard disk bay to protect your disks. Finally, there's a third 120mm fan with speed control mounted at the rear of the case. If that's not enough, there are 120mm fan mountings in the middle of the case for the processor and one in the window to help cool the graphics card. The fans all have blue LEDs in them, which makes the case look attractive when it's lit up. Unfortunately, having all these fans can add to the noise. It was acceptable with all the fans set to their lowest speeds, but when they were on full power there was a distinct hum. Our advice is to connect only the fans you need to use and then adjust the fan controls to keep the case's noise at an acceptable level.

This is a great-looking, well-designed case that will keep the hottest of computers cool, but the number of fans can make it loud. Antec's own P150 (see 'Also consider...' below) costs £25 more, but is a better-value general-purpose case and comes with a silent power supply.

David Ludlow

SUMMARY

- ✓ Well designed
- ✓ Lots of cooling
- ✗ Can get messy inside

ATX CASE 200mm fan, three 120mm fans, two USB2, one FireWire, two audio ports, three 5¼in drive bays, six internal 3½in drive bays

PART CODE 0761345-08009-5

SUPPLIER www.morecomputers.co.uk

DETAILS www.antec.com

ANTEC P150

PRICE CUT!

★★★★★

£92 inc VAT

Antec's white steel P150 case looks great on the desk and is built to keep your PC silent. It doesn't rattle, has acoustic insulation and the hard disks screw into rubber grommets to prevent echoing vibrations. A silent Antec Neo HE 430W modular power supply is also included, all of which make this case excellent value.



SILENT PC CASE ATX case, 120mm fan, two USB2, one FireWire, two audio ports, two 5¼in drive bays, one external 3½in drive bay, four internal 3½in drive bays
PART CODE 0761345-019151-0 SUPPLIER www.morecomputers.com
DETAILS www.antec.com
✓ Attractive; comes with power supply
✗ Drive bays hard to access
FULL REVIEW Mar 2006

ECS KN3 SLI2

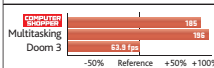
★★★★★

£94 inc VAT

The KN3 SLI2 is ECS's first SLI motherboard for Socket AM2. It uses Nvidia's high-end 690 chipset, which runs both PCI-E x16 slots at full speed. There are plenty of expansion options. It comes with all the cables, adaptors and instructions you'll need. It's an excellent-value high-end motherboard.



AMD MOTHERBOARD Nvidia nForce 590 chipset, supports AMD Socket AM2 processors, two PCI, two PCI-E x1, two PCI-E x16 slots, four DIMM slots, two Gigabit Ethernet, Four USB2, eSata ports
PART CODE KN3 SLI2 SUPPLIER www.pcnextday.co.uk
DETAILS www.ecs.com.tw
✓ Excellent performance
✗ ATX connection can be fiddly
FULL REVIEW Mar 2007



ECS PN1 SLI2 Extreme

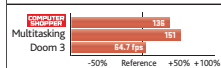
★★★★★

£112 inc VAT

This is the first motherboard we've seen to use Nvidia's 590 SLI chipset for Intel processors, with support for the latest Core 2 Duo models. It has plenty of expansion ports, including a FireWire 800 port, which isn't common on PCs. It's great value.



INTEL MOTHERBOARD Nvidia nForce 590 chipset, supports Intel LGA775 processors, two PCI, two PCI-E x1, PCI-E x4, two PCI-E x16 slots, four DIMM slots, two Gigabit Ethernet, four USB2, FireWire, FireWire 800 ports, 7.1 analogue, optical and coaxial S/PDIF outputs
PART CODE PN1 SLI2 SUPPLIER www.pcnextday.co.uk
DETAILS www.ecs.com.tw
✓ Very quick
✗ Two cooling fans increase noise
FULL REVIEW Mar 2007



ZEROTHERM BTF95

★★★★

£36 inc VAT

ZeroTherm's 128mm-tall butterfly-shaped processor cooler is fanless. The polished copper pad conducts hot air from your processor to the rows of thin heat fins, which help dissipate the heat. However, you still need a case fan to carry this hot air out of the case.

The BTF95 can be used with AMD and Intel processors. ZeroTherm recommends a maximum of an Athlon 64 3400+ processor. While the instructions say it's compatible with the Pentium 4, we'd be wary as these processors can run very hot so we'd use this product only on Core 2 Duo processors.

If you have an AMD-based PC, fitting the BTF95 couldn't be easier. It uses the standard heatsink mount, so all you have to do is clip the cooler into place. We tested it on an Athlon 64 3400+ and found the BTF95 kept it running at 39°C when idle and 55°C at full load. The reference AMD cooler was slightly better at 38°C when idle and 48°C at full load. For AMD systems, we'd recommend this only for lower-speed processors that aren't used for a lot of processor-intensive work or overclocking.

Fitting the BTF95 to an Intel processor is more involved, as



you have to remove the motherboard and fit a backing plate to the underside of the processor socket. Running a Core 2 Duo E6300 (1.86GHz), we found that Intel's stock cooler kept the processor running at 41°C when idle and 45°C under load; the BTF95 was close to this

performance with 43°C when idle and 47°C under load. Again, we'd be careful if you plan to overclock or wish to run lots of processor-intensive tasks.

We'd rather stick with a standard heatsink and fan for AMD processors, but if you have a Core 2 Duo you want to run silently, this does the job well.

David Ludlow

SUMMARY

- ✓ Intel and AMD design
- ✓ Silent
- ✗ Heatsink and fan more effective

PROCESSOR COOLER AMD Socket-939 and Socket AM2, Intel LGA775
PART CODE BTF95
SUPPLIER www.quietpc.com
DETAILS www.zerotherm.net

ZEROTHERM CF800

★★★★★

£20 inc VAT

The standard Intel reference heatsink and fan does a good job, but you can get your processor cooler for overclocking or extend its lifespan by using a third-party cooler, such as ZeroTherm's CF800. Better cooling usually means a larger heatsink and fan, but the CF800 is just 77mm high, around the same height as the reference Intel cooler.

The CF800 uses clever techniques to keep the processor's temperature down. To start with, you have to remove your motherboard and attach the metal backing plate. The cooler screws into this plate, which makes it more securely attached than with Intel's standard plastic plugs. The polished copper plate then attaches to four heat pipes that run into the heatsink and its cooling fins.

The fins also house a thermistor, which senses the temperature of the heatfins and adjusts the fan speed to compensate, so you don't need to adjust any BIOS settings. When you first turn on your PC, the fan is very quiet as the heatsink is still cold. When you perform more processor-intensive tasks, the fan picks up speed. This doesn't mean it's particularly loud, as the fan



operates between 16dB and 30dBA, although you'll be able to hear it operating at full speed.

We tested the CF800 on a Core 2 Duo E6300 (1.86GHz). The reference Intel cooler managed 41°C when idle and 45°C under load; the CF800 managed 35°C when idle and 40°C when we ran the processor at full load. This gives quite a bit of room for overclocking should you want to try it and keeps your PC cooler than when using the reference cooler.

For £20 including VAT this is good value, but the modest temperature reduction means it's better as a replacement for a broken cooler rather than as an upgrade.

David Ludlow

SUMMARY

- ✓ Good value
- ✓ Automatic fan speed adjustment
- ✗ Standard Intel cooler is similar

PROCESSOR COOLER Supports Intel LGA775 processors, 90mm fan, 800-2,300rpm spin speed, 16-30dBA operating volume
PART CODE CF800
SUPPLIER www.quietpc.com
DETAILS www.zerotherm.net

CHOOSING A... Processor

Follow the steps to find your ideal specs

MANUFACTURER: AMD

PROCESSOR: Sempron 3000+

SOCKET: AM2

Recommended minimum in grey

1 A processor with the minimum specifications above costs around £35. It's not particularly quick and is best suited to standard office applications. As it uses the latest Socket AM2 interface, you'll need a new motherboard to match, but you'll be able to upgrade to any of AMD's newer processors.

2 If you're upgrading only your processor, you'll be limited by your motherboard's socket type. AMD Socket 754 boards provide the least choice, with an Athlon 64 3400+ the fastest processor you can buy. Socket 939 motherboards provide more options, including dual-core X2 processors and going as fast as the FX-60. Socket AM2 is the latest, supporting AMD's full range.

Intel's LGA775 socket has been around for a few years, but check your motherboard's manual for processor support as only the latest chipsets support Intel's Core 2 Duo processors.

3 If you're building a PC from scratch, it's best to pick the processor first and choose a motherboard to match. If you're building a basic office PC, a single-core Intel Celeron or AMD Sempron will be fine. If you do a lot of intensive tasks, a dual-core AMD X2 or Intel Core 2 Duo processor is a better choice.

The Core 2 Duo range is our current favourite. The E6300 (around £160) is a good entry-level choice, while the E6700 (around £350) is very quick. If your motherboard doesn't support Core 2 Duo, the Pentium D range of dual-core processors is still quick. The old single-core Pentium 4s and Athlon 64s are no longer good value and we'd avoid them unless your motherboard doesn't support dual-core.

4 Want to overclock? Intel's Extreme processors and AMD's FX processors are multiplier unlocked, so you can adjust their speeds without affecting your memory or other components. However, the Core 2 Extreme X6800 costs around £650.

5 You can buy Intel's mobile Core 2 Duo and Core Duo processors, too. However, you'll need a motherboard or barebones with a compatible Socket 479. Mobile processors are more expensive, so buy one only if you need to.